REMARKS

Upon entry of the instant Amendment, Claims 12 will remain pending in this application.

In the Office Action mailed June 12, 2006, Claims 1-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 3,346,529 issued to Peters, U.S. Pat. No. 3,807,703 issued to Day, U.S. Pat. No. 5,100,699 issued to Roeser, U.S. Pat. No. 3,319,937 issued to Wilson et al., U.S. Pat. No. 3,051,455 issued to Magester and U.S. Pat. No. 3,881,871 issued to Porter. Claims 1-12 are rejected under 35 U.S.C. §112, second paragraph as being indefinite. The Examiner made those rejections FINAL.

Rejections under 35 U.S.C. §112, second paragraph

Claims 1-12 stand rejected under 35 U.S.C. §112, second paragraph as being indefinite. The Examiner contends at page 2, paragraph numbered 2 that,

> A. The instant claim preamble recites "A method for the production of polyurethane foam material comprising controlling cell size in the foam made by continuous mixing of at least one polyol component and at least one isocyanate component and optionally additives to form a polyurethane reaction mixture..." The claim ultimately only recites "discharging the polyurethane reaction mixture" and "reducing the polyurethane reaction mixture pressure". The claims do not require a foaming step nor require foaming means, e.g. a blowing agent. It is therefore unclear what is required of the instant claims. Specifically, it is unclear when and how and where the polyurethane reaction mixture is foamed. While the preamble requires foaming there is no foaming step in the method particularly pointed out and distinctly claimed. Thus, it is unclear what is regarded as the instant invention. It is unclear how to control the cell size since foaming is never recited nor is a means to control the cell size recited. At the end of the claimed process a polyurethane reaction mixture is discharged and the pressure thereon reduced. The reaction mixture is not a foam.

Applicants have amended Claim 1 to recite an improvement to the method of producing a polyurethane foam, wherein the improvement involves controlling cell size of the foam by adjustment of the pressure in the mixing chamber. Applicants submit that because of this change, the claims are in compliance with 35 U.S.C.

§112, second paragraph, and respectfully request the Examiner reconsider and reverse his rejection of Claims 1-12 under 35 U.S.C. §112, second paragraph, as being indefinite.

Rejections under 35 U.S.C. §103(a)

Claims 1-12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 3,346,529 issued to Peters, U.S. Pat. No. 3,807,703 issued to Day, U.S. Pat. No. 5,100,699 issued to Roeser, U.S. Pat. No. 3,319,937 issued to Wilson et al., U.S. Pat. No. 3,051,455 issued to Magester and U.S. Pat. No. 3,881,871 issued to Porter. Applicants respectfully disagree with the Examiner's contention regarding the cited art.

As stated previously, only U.S. Pat. No. 3,319,937 issued to Wilson et al., addresses controlling cell size of a foamed material, teaching, at col. 4, lines 72-73, a preferred pressure in the mixing zone of between 10 to 15 psi (0.7 to 1 bar). Additionally Wilson et al. use a valve at the outlet of the mixer in order to adjust the desired pressure inside of the mixing chamber. However, Wilson et al. fail to address the problem of an increasing pressure in the mixing zone as a consequence of an increasing rotational stirrer speed, and they fail to provide any teaching or suggestion to one of ordinary skill in the art as to how to solve the problem. It is well established that a reference which does not recognize a problem can not suggest a solution. *In re Shaffer*, 108 USPQ 326 (CCPA 1956). Wilson et al. state at col. 4, lines 66-69, that ,"... with higher mixing speeds the average pores in the foam will be quite fine whereas with a decrease in such mixing speed, said pores become coarse and of increased average size".

It is, however, well-known today that the pressure in the mixing chamber is an important parameter with regard to cell size (*See e.g.*, U.S. Pat. No. 5,296,517). One of ordinary skill in the art would be aware of the conflict between the adjustability of a low pressure and a high rotational stirrer speed in modern plants with high throughput of material up to more than 500 kg/min, and the demand for rather low residence time of the reactive mixture inside the mixing zone, because some mixtures start to gel after a few seconds.

The process described by Wilson et al. would not work with very reactive systems (which start to react after a few seconds), because they suggest a permissible time interval between the introduction of the last liquid component into the head and the ejection of the mixed components the from outlet nozzle between 10 to 20 seconds (at col. 4, lines 42-43). As a consequence of this very long residence time inside the mixer, the mixer must be designed to be long enough to have good mixing at moderate rotational stirrer speed of 1,500 to 3,000 rpm (at col. 4, lines 64-65). Modern mixers often run at a rotational speed of up to 6,000 rpm, which produces a very strong effect on the pressure in the mixing chamber.

None of the other cited references, alone or in combination, teach or suggest a process for the control of the cell size in the production of foamed material. Additionally, none of those references mention the possibility of reducing the pressure in the mixing chamber at high rotational stirrer speeds by using a stirrer with inclined blades.

Day, in U.S. Pat. No. 3,807,703, uses a stirrer with inclined blades, but fails to describe the effect of the pressure inside the mixing chamber on the cell size of the foamed material. Porter, in U.S. Pat. No. 3,881,871, describes the use of a valve at the outlet of the mixing zone, but does not mention any relationship between pressure and cell size.

The competing objectives of having proper mixing (which requires high rotational speed), high output (which causes relatively high pressure drop flowing through the mixing chamber), a small residence time (which requires a small mixer volume, increasing the problem of pressure drop of the high amount flowing through the mixing chamber), and a low pressure in the mixing zone are not addressed in any of the cited references. The inventive method solves this complex problem. And although it is known to manipulate the flow rate through a mixer by changing the rotational speed, if the mixer is fed by a free reservoir, this would not teach or suggest to one of ordinary skill in the art the use of a stirrer with inclined blades to reduce pressure inside the mixing chamber at increasing rotational speed of the stirrer when the components are fed to the mixing chamber in a metered manner by pumps.

Therefore, Applicants contend that nothing in the teaching of the cited art would lead one of ordinary skill in the art to the instantly claimed invention and respectfully request the Examiner reconsider and reverse his rejection of Claims 1-12 under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 3,346,529 issued to Peters, U.S. Pat. No. 3,807,703 issued to Day, U.S. Pat. No. 5,100,699 issued to Roeser, U.S. Pat. No. 3,319,937 issued to Wilson et al., U.S. Pat. No. 3,051,455 issued to Magester and U.S. Pat. No. 3,881,871 issued to Porter.

Conclusion

Applicants have amended Claim 1. Such claim amendment adds no new matter and finds support in the specification.

Applicants submit that the instant application is in condition for allowance. Accordingly, reconsideration and a Notice of Allowance are respectfully requested for Claims 1-12. If the Examiner is of the opinion that the instant application is in condition for other than allowance, he is invited to contact the Applicants' attorney at the telephone number listed below, so that additional changes to the claims may be discussed.

Respectfully submitted,

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